

SEQUENCE LISTING

<110> Tavtigian, Sean V.
Teng, David H.F.
Simard, Jacques
Rommens, Johanna M.
Myriad Genetics, Inc.

<120> Chromosome 17p-Linked Prostate Cancer Susceptibility
Gene and a Paralog and Orthologous Genes

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<150> US 60/107,468

<151> 1998-11-06

<150> 09/434,382

<151> 1999-11-05

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<170> PatentIn Ver. 2.0

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 Ala Gly Ser Arg Asp Ser Gly Ala Ala Leu Tyr Val Phe Ser Glu Phe
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 Asn Arg Tyr Leu Phe Asn Cys Gly Glu Gly Val Gln Arg Leu Met Gln
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 Glu His Lys Leu Lys Val Ala Arg Leu Asp Asn Ile Phe Leu Thr Arg
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 Ile Glu Leu Ala Val Arg Pro His Ser Ala Pro Glu Tyr Glu Asp Glu
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 Thr Met Thr Val Tyr Gln Ile Pro Ile His Ser Glu Gln Arg Arg Gly
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 is C or T; n at position 13128 is t or tgat; r at
 positions 22211 and 23879 is A or G.

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<400> 124
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 T002T-099551

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<400> 149
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<400> 150
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<210> 151
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<400> 151
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<400> 152
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<400> 153
ccagcctttg tgtaagtcta c

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<213> Homo sapiens
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19

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39

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<400> 156
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38

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19

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gttttcccag tcacgacgtt agaggctggt gggtgac

37

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<400> 160
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<210> 161
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 <213> Homo sapiens

<400> 161
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<210> 162
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<400> 165
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<400> 166
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<400> 167
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<400> 170
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38

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<400> 175
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<400> 176
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<210> 177
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<210> 178
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<400> 178
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<400> 179
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<400> 180
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39

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<400> 191
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<210> 192
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 <213> Homo sapiens

<400> 192
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<210> 193
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<400> 193
 gcaccctggc trctgtgttt gtg 23

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<400> 194
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<400> 202
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23

<210> 203
 <211> 24
 <212> DNA
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<400> 203
 ggttttcttg attcagcagt taca

24

<210> 204
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<400> 204
 ggttttcttg atgattcagc agttaca

27

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<400> 205
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23

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<400> 206
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23

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<400> 207
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23

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<400> 208
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23

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 T002T-2992660

<210> 209
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 <213> Homo sapiens

<400> 209
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<400> 210
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gcg ctt tgc tcg ctg ctg cgg tcc gcg gcc gga cgc acc atg tcg cag 104
 Ala Leu Cys Ser Leu Leu Arg Ser Ala Ala Gly Arg Thr Met Ser Gln
 5 10 15

gga cgc acc ata tcg cag gca ccc gcc cgc cgc gag cgg ccg cgc aag 152
 Gly Arg Thr Ile Ser Gln Ala Pro Ala Arg Arg Glu Arg Pro Arg Lys
 20 25 30

gac ccg ctg cgg cac ctg cgc acg cga gag aag cgc gga ccg tcg ggg 200
 Asp Pro Leu Arg His Leu Arg Thr Arg Glu Lys Arg Gly Pro Ser Gly
 35 40 45 50

tgc tcc ggc ggc cca aac acc gtg tac ctg cag gtg gtg gca gcg ggt 248
 Cys Ser Gly Gly Pro Asn Thr Val Tyr Leu Gln Val Val Ala Ala Gly
 55 60 65

agc cgg gac tcg ggc gcc gcg ctc tac gtc ttc tcc gag ttc aac 293
 Ser Arg Asp Ser Gly Ala Ala Leu Tyr Val Phe Ser Glu Phe Asn
 70 75 80

cggtcagtcac acgagccacg ccccgccccg ctgggccctc agtgccggcg agcctct 350

<210> 211
 <211> 81
 <212> PRT
 <213> Homo sapiens

<400> 211
 Met Trp Ala Leu Cys Ser Leu Leu Arg Ser Ala Ala Gly Arg Thr Met
 1 5 10 15

Ser Gln Gly Arg Thr Ile Ser Gln Ala Pro Ala Arg Arg Glu Arg Pro
 20 25 30

Arg Lys Asp Pro Leu Arg His Leu Arg Thr Arg Glu Lys Arg Gly Pro
 35 40 45

Ser Gly Cys Ser Gly Gly Pro Asn Thr Val Tyr Leu Gln Val Val Ala
 50 55 60

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Ala Gly Ser Arg Asp Ser Gly Ala Ala Leu Tyr Val Phe Ser Glu Phe
 65 70 75 80

Asn

<210> 212
 <211> 326
 <212> DNA
 <213> Mus musculus

<220>
 <221> CDS
 <222> (51)..(269)

<400> 212
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 Met Trp
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 gcg ctc cgc tca ctg ttg cgt ccc ctt ggc ctg cgc acc atg tcg cag 104
 Ala Leu Arg Ser Leu Leu Arg Pro Leu Gly Leu Arg Thr Met Ser Gln
 5 10 15
 ggt tcg gct cgt cgg ccg cgg cca ccc aag gac cca ctg cga cac ctg 152
 Gly Ser Ala Arg Arg Pro Arg Pro Pro Lys Asp Pro Leu Arg His Leu
 20 25 30
 cgt acg cgg gag aag cgc ggc ccg ggt ccc ggg ggc ccg aac acc gtg 200
 Arg Thr Arg Glu Lys Arg Gly Pro Gly Pro Gly Gly Pro Asn Thr Val
 35 40 45 50
 tac ctg cag gtg gtg gcg gcg ggc ggc cgg gac gcg ggg gct gct ctc 248
 Tyr Leu Gln Val Val Ala Ala Gly Gly Arg Asp Ala Gly Ala Ala Leu
 55 60 65
 tat gtc ttc tcg gaa tac aac aggtcagagt gggccgacag ccctggggga 299
 Tyr Val Phe Ser Glu Tyr Asn
 70
 ttggccccag cgccacgtgc tcgggag 326

<210> 213
 <211> 73
 <212> PRT
 <213> Mus musculus

<400> 213
 Met Trp Ala Leu Arg Ser Leu Leu Arg Pro Leu Gly Leu Arg Thr Met
 1 5 10 15
 Ser Gln Gly Ser Ala Arg Arg Pro Arg Pro Pro Lys Asp Pro Leu Arg
 20 25 30
 His Leu Arg Thr Arg Glu Lys Arg Gly Pro Gly Pro Gly Gly Pro Asn
 35 40 45
 Thr Val Tyr Leu Gln Val Val Ala Ala Gly Gly Arg Asp Ala Gly Ala
 50 55 60
 Ala Leu Tyr Val Phe Ser Glu Tyr Asn
 65 70

09080697 112004

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 <222> (1)..(300)
 <223> Upstream intron of exon 2.

<220>
 <221> misc_structure
 <222> (301)..(465)
 <223> Exon 2.

<220>
 <221> intron
 <222> (466)..(983)
 <223> Intron downstream of exon 2.

<400> 216
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 attgcctggg tttggttatt tttgtttgtt tgggtgtgtg aacaattata caagatttgt 120
 taacttgtag ttttagccaa gttattaaaa ccttactgtg gatatgtgtg gaatactatg 180
 agagaccaag aatccagact gttctaaata accaaaaagt aataatagag ataaatatta 240
 caggaatatg tttttggtcc agtgatatga aataatcccc agatgatctt tctgttgag 300
 ggtggaagat gtctatggat gtgacattcc tggggacggg tgcagcatac ccatctccaa 360
 cccgggggtgc ctctgctgtg gtccttcggt gtgaaggcga gtgctggctc tttgactgtg 420
 gggagggaa acagacacag cttatgaaaa gccaaactta agcagggttag tgtgccttca 480
 gctatctcat taagaatttt ttgttgttct gcttcatttt cttggctctc cttggacatt 540
 ttgttttagaa acagccctga tggttgcac ccacttcagt gctacaccct ggtgagactt 600
 ggaaggcctg caggcatctg gccacgtcca ctgaacttca tttacttatt tacttgcttt 660
 tcatttatcc tgtagatgct gaaagcaagg attcatgtag gcttgggggt tgggaaatgt 720
 cgtgggatac accaggcata ttagatgaac actgccttag caaggaagca gtgtacatac 780
 ttacctccac caggagatag ttttcatgag aggatgcaaa gggtaggaaa tgtttggagg 840
 aggagatggt gttttcctct tggggttatc aggtaaactt ctcagagaag ttgacctgtg 900
 gattgtcaaa gagagagatt tcaggctgag agaagaaggc atttcatcag gggatggagt 960
 gagcagagcc acacctggga gat 983

<210> 217
 <211> 1287
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<220>
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 <222> (1)..(300)
 <223> Intron upstream of exon 3.

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<220>
<221> intron
<222> (769)..(1287)
<223> Intron downstream of exon 3.
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<210> 218
<211> 1378
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<213> Homo sapiens
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<220>
 <221> intron
 <222> (1)..(300)
 <223> Intron upstream of exon 4.

<220>
 <221> misc_feature
 <222> (301)..(966)
 <223> Exon 4 with CDS ending at 764.

<220>
 <221> intron
 <222> (967)..(1378)
 <223> Intron downstream of exon 4.

<400> 218
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 ggagactaaa acttgtctga catgtatgca tgggaaatgt ttcaagtact aaggcattgc 120
 taatatcaat caacactgaa attttaaaaa tgtataaaatc cagttttcca caagtagtaa 180
 aacatttata acaattatgg atgccttttc cattagctat ttgcaatgct gttaaaatag 240
 actcttgaaa agtcataaat tccattccta tgatgtaatg ttatctgcct tcatcattag 300
 gtgttccacc aggtcctgcc tatgggaagc tgaaaaatgg aatttctgtt gttctggaaa 360
 atgggggttac aatttctccc caagatgtct taaaaaagcc tattgttgga agaaaaatct 420
 gcatattggg tgactgtctt ggggttggtg gtgatggagg agtaaaactg tgctttgaag 480
 cagacctgtt gatccacgaa gcaaccctgg atgatgccca gatggacaaa gcaaaggagc 540
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 tggttctgac tcaattcagt cagaggtaca aaccagttgc cttggccaga gaaggagaaa 660
 cagatggcat tgcagaacta aaaaagcaag ctgaatcagt gttagatctc caagaagtga 720
 ctctagcaga agattttatg gtgataagca ttccaatcaa gaaatgaaac cagtgttctc 780
 gagtgcacac tgacatgtct gtgaatatgt tactgaacct atagtccagt ttttttattt 840
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 atgaattggc tcagtattta aaggagcaa actttttgat aataaatctt tttaagagaa 960
 aaaaaaccca gcatcctttt tgaagtccag atttgtcaaa atgatagact attcagttat 1020
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 tgtcatgaga cgttggacag gcaggattga tgatagcatg accatagctt tgctggaata 1260
 ctgaatgcag ggtttggcta ggtgtttatt ttaacatttt attaaacttt ctatttgggt 1320
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0998660
 2098660
 1003777

<400>	219																	
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ccgcgacagc	tggggccgagg	gtgcggggcct	gcgcctccctc	ggctcctggc	gcgggctcgg	120												
ggagaggggt	ggaag	atg	tct	atg	gat	gtg	aca	ttc	ctg	ggg	acg	ggg	gca	171				
	Met	Ser	Met	Asp	Val	Thr	Phe	Leu	Gly	Thr	Gly	Ala						
	1				5					10								
gca	tac	cca	tct	cca	acc	cgg	ggt	gcc	tct	gct	gtg	gtc	ctt	cgg	tgt	219		
Ala	Tyr	Pro	Ser	Pro	Thr	Arg	Gly	Ala	Ser	Ala	Val	Val	Leu	Arg	Cys			
		15					20					25						
gaa	ggc	gag	tgc	tgg	ctc	ttt	gac	tgt	ggg	gag	gga	aca	cag	aca	cag	267		
Glu	Gly	Glu	Cys	Trp	Leu	Phe	Asp	Cys	Gly	Glu	Gly	Thr	Gln	Thr	Gln			
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ctt	atg	aaa	agc	caa	ctt	aaa	gca	ggg	aga	att	acc	aag	atc	ttc	atc	315		
Leu	Met	Lys	Ser	Gln	Leu	Lys	Ala	Gly	Arg	Ile	Thr	Lys	Ile	Phe	Ile			
45					50					55					60			
aca	cac	ctt	cat	gga	gac	cat	ttc	ttt	ggc	ctt	cct	ggg	ctc	ctc	tgc	363		
Thr	His	Leu	His	Gly	Asp	His	Phe	Phe	Gly	Leu	Pro	Gly	Leu	Leu	Cys			
				65					70					75				
aca	atc	agc	ctg	cag	agt	ggc	tcc	atg	gtg	tcc	aaa	cag	cct	att	gaa	411		
Thr	Ile	Ser	Leu	Gln	Ser	Gly	Ser	Met	Val	Ser	Lys	Gln	Pro	Ile	Glu			
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Ile	Tyr	Gly	Pro	Val	Gly	Leu	Arg	Asp	Phe	Ile	Trp	Arg	Thr	Met	Glu			
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ctc	tct	cac	acg	gag	ctg	gtc	ttc	cat	tat	gtg	gtt	cat	gaa	ctg	gtt	507		
Leu	Ser	His	Thr	Glu	Leu	Val	Phe	His	Tyr	Val	Val	His	Glu	Leu	Val			
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cct	aca	gca	gat	caa	tgt	cct	gca	gaa	gaa	cta	aaa	gaa	ttt	gcg	cat	555		
Pro	Thr	Ala	Asp	Gln	Cys	Pro	Ala	Glu	Glu	Leu	Lys	Glu	Phe	Ala	His			
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gtg	aat	aga	gca	gac	agt	cct	ccc	aaa	gag	gaa	caa	gga	aga	act	atc	603		
Val	Asn	Arg	Ala	Asp	Ser	Pro	Pro	Lys	Glu	Glu	Gln	Gly	Arg	Thr	Ile			
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gtg	tta	gac	tca	gaa	gaa	aac	tca	tac	ctt	ctg	ttt	gat	gat	gaa	caa	651		
Leu	Leu	Asp	Ser	Glu	Glu	Asn	Ser	Tyr	Leu	Leu	Phe	Asp	Asp	Glu	Gln			
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Gln	Leu	Lys	Ala	Gly	Arg	Ile	Thr	Lys	Ile	Phe	Ile	Thr	His	Leu	His
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Gly	Asp	His	Phe	Phe	Gly	Leu	Pro	Gly	Leu	Leu	Cys	Thr	Ile	Ser	Leu
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Gln	Ser	Gly	Ser	Met	Val	Ser	Lys	Gln	Pro	Ile	Glu	Ile	Tyr	Gly	Pro
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Val	Gly	Leu	Arg	Asp	Phe	Ile	Trp	Arg	Thr	Met	Glu	Leu	Ser	His	Thr
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Gln	Cys	Pro	Ala	Glu	Glu	Leu	Lys	Glu	Phe	Ala	His	Val	Asn	Arg	Ala
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Glu	Glu	Asn	Ser	Tyr	Leu	Leu	Phe	Asp	Asp	Glu	Gln	Phe	Val	Val	Lys
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Ala	Phe	Arg	Leu	Phe	His	Arg	Ile	Pro	Ser	Phe	Gly	Phe	Ser	Val	Val
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Glu	Lys	Lys	Arg	Pro	Gly	Lys	Leu	Asn	Ala	Gln	Lys	Leu	Lys	Asp	Leu
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Val	Val	Gly	Asp	Gly	Gly	Val	Lys	Leu	Cys	Phe	Glu	Ala	Asp	Leu	Leu
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Ile	His	Glu	Ala	Thr	Leu	Asp	Asp	Ala	Gln	Met	Asp	Lys	Ala	Lys	Glu
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His	Gly	His	Ser	Thr	Pro	Gln	Met	Ala	Ala	Thr	Phe	Ala	Lys	Leu	Cys
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Arg	Ala	Lys	Arg	Leu	Val	Leu	Thr	His	Phe	Ser	Gln	Arg	Tyr	Lys	Pro
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Val	Ala	Leu	Ala	Arg	Glu	Gly	Glu	Thr	Asp	Gly	Ile	Ala	Glu	Leu	Lys
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Lys	Gln	Ala	Glu	Ser	Val	Leu	Asp	Leu	Gln	Glu	Val	Thr	Leu	Ala	Glu
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 Ser Gln Gly Ser Ala Arg Arg Pro Arg Pro Pro Lys Asp Pro Leu Arg
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 cac ctg cgt acg cgg gag aag cgc ggc ccg ggt ccc ggg ggc ccg aac 144
 His Leu Arg Thr Arg Glu Lys Arg Gly Pro Gly Pro Gly Gly Pro Asn
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 Thr Val Tyr Leu Gln Val Val Ala Ala Gly Gly Arg Asp Ala Gly Ala
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 gct ctc tat gtc ttc tcg gaa tac aac agg tac ctt ttt aac tgc gga 240
 Ala Leu Tyr Val Phe Ser Glu Tyr Asn Arg Tyr Leu Phe Asn Cys Gly
 65 70 75 80
 gaa ggc gtc caa cga ctt atg cag gaa cac aag act gaa agt cgc tcg 288
 Glu Gly Val Gln Arg Leu Met Gln Glu His Lys Thr Glu Ser Arg Ser
 85 90 95
 ctt gac aac atc ttt ctg act cgg atg cat tgg tca aat gtt ggg ggg 336
 Leu Asp Asn Ile Phe Leu Thr Arg Met His Trp Ser Asn Val Gly Gly
 100 105 110
 ttg tgt gga atg att tta act tta aag gaa acc ggg ctt ccc aaa tgt 384
 Leu Cys Gly Met Ile Leu Thr Leu Lys Glu Thr Gly Leu Pro Lys Cys
 115 120 125
 gtt ctg tct gga cca cca cag ctg gag aaa tat cta gaa gca atc aaa 432
 Val Leu Ser Gly Pro Pro Gln Leu Glu Lys Tyr Leu Glu Ala Ile Lys
 130 135 140
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 Ile Phe Ser Gly Pro Leu Lys Gly Ile Glu Leu Ala Val Arg Pro His
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 Ser Ala Pro Glu Tyr Lys Asp Glu Thr Met Thr Val Tyr Gln Val Pro
 165 170 175
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 Ile His Ser Glu Arg Arg Cys Gly Lys Gln Gln Pro Ser Gln Ser Pro
 180 185 190

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Phe	Leu	Val	Leu	Lys	Ala	Lys	Glu	Leu	Gly	Leu	Pro	Val	Gly	Thr	Ala	
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Tyr	Glu	Gly	Arg	Glu	Ile	Ala	Ala	Glu	Glu	Leu	Cys	Thr	Pro	Pro	Asp	
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Pro	Gly	Leu	Val	Phe	Ile	Val	Val	Glu	Cys	Pro	Asp	Glu	Gly	Phe	Ile	
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Leu	Pro	Ile	Cys	Glu	Asn	Asp	Thr	Phe	Lys	Arg	Tyr	Gln	Ala	Glu	Ala	
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Gln	His	Leu	Ile	Leu	Asn	Glu	Asn	Cys	Pro	Ser	Val	His	Asn	Leu	Arg	
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Ser	His	Lys	Ile	Gln	Thr	Gln	Leu	Ser	Leu	Ile	His	Pro	Asp	Ile	Phe	
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ccc	cag	ctt	acc	agc	ttc	tat	agt	aag	gag	gaa	ggg	tcc	acc	ctc	agc	1200
Pro	Gln	Leu	Thr	Ser	Phe	Tyr	Ser	Lys	Glu	Glu	Gly	Ser	Thr	Leu	Ser	
					390				395						400	
gtg	cca	aca	gtt	cgg	ggt	gaa	tgc	ctc	ctc	aag	tat</					

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Glu Tyr Arg Lys Asn Val Gln Glu Asn Pro Ala Pro Ala Glu Lys Arg	
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Ser Gln Tyr Pro Glu Ile Val Phe Leu Gly Thr Gly Ser Ala Ile Pro	
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Lys Ser Val Leu Leu Asp Cys Gly Glu Gly Thr Phe Gly Gln Leu Cys	
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Arg His Tyr Gly Gln Gln Ile Asp Arg Val Leu Cys Ser Leu Thr Ala	
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Val Phe Val Ser His Leu His Ala Asp His His Thr Gly Leu Leu Asn	
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Ile Leu Leu Gln Arg Glu His Ala Leu Ala Ser Leu Gly Lys Pro Phe	
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Gln Pro Leu Leu Val Val Ala Pro Thr Gln Leu Arg Ala Trp Leu Gln	
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Gln Tyr His Asn His Cys Gln Glu Ile Leu His His Val Ser Met Ile	
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gaa agg ctg ata agc ttg ctg ttg gaa aca tgt gac tta gaa gaa ttt	1872
Glu Arg Leu Ile Ser Leu Leu Leu Glu Thr Cys Asp Leu Glu Glu Phe	
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Gln Thr Cys Leu Val Arg His Cys Lys His Ala Phe Gly Cys Ala Leu	
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Val His Ser Ser Gly Trp Lys Val Val Tyr Ser Gly Asp Thr Met Pro	
645 650 655	
tgt gag gct ctg gtc cag atg ggg aaa gat gcc acc ctc ctg ata cat	2016
Cys Glu Ala Leu Val Gln Met Gly Lys Asp Ala Thr Leu Leu Ile His	
660 665 670	
gaa gcc act ctg gag gat cnc ttg gaa gag gaa gca gta gag agg aca	2064
Glu Ala Thr Leu Glu Asp Xaa Leu Glu Glu Glu Ala Val Glu Arg Thr	
675 680 685	
cac agc acc acc tcc cag gct att aat gtg ggg atg cgg atg aat gcg	2112
His Ser Thr Thr Ser Gln Ala Ile Asn Val Gly Met Arg Met Asn Ala	
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atg aag gtc tgn ttt gga gac ttc ccg aca gtg ccc aag ctg att ccc Met Lys Val Xaa Phe Gly Asp Phe Pro Thr Val Pro Lys Leu Ile Pro 740 745 750	2256
cca ctg aag gcc ctg ttt gca ggt gac att gaa gag atg gtg gaa cgc Pro Leu Lys Ala Leu Phe Ala Gly Asp Ile Glu Glu Met Val Glu Arg 755 760 765	2304
agg gag aag agg gag cta cgg ctg gtg cga gca gcc ctc ctg acc cag Arg Glu Lys Arg Glu Leu Arg Leu Val Arg Ala Ala Leu Leu Thr Gln 770 775 780	2352
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 Ser Ala Pro Glu Tyr Lys Asp Glu Thr Met Thr Val Tyr Gln Val Pro
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 Ile His Ser Glu Arg Arg Cys Gly Lys Gln Gln Pro Ser Gln Ser Pro
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 Arg Thr Ser Pro Asn Arg Leu Ser Pro Lys Gln Ser Ser Asp Ser Gly
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 Ser Leu Val Val Ala Phe Val Cys Lys Leu His Leu Arg Lys Gly Asn
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 Phe Leu Val Leu Lys Ala Lys Glu Leu Gly Leu Pro Val Gly Thr Ala
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 Ala Ile Ala Pro Ile Ile Ala Ala Val Lys Asp Gly Lys Ser Ile Thr
 260 265 270
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Ser Gln Tyr Pro Glu Ile Val Phe Leu Gly Thr Gly Ser Ala Ile Pro
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 740 745 750
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Arg Lys Asp Pro Leu Arg His Leu Arg Thr Arg Glu Lys Arg Gly Pro	
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Ser Gly Cys Ser Gly Gly Pro Asn Thr Val Tyr Leu Gln Val Val Ala	
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Asn Arg Tyr Leu Phe Asn Cys Gly Glu Gly Ile Gln Arg Leu Met Gln	
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Ile Glu Leu Ala Val Arg Pro His Ser Ala Pro Glu Tyr Glu Asp Glu	
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Thr Met Thr Val Tyr Gln Ile Pro Ile His Ser Glu Gln Arg Arg Gly	
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099888687-112001

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Arg	Tyr	Gln 355	Gln	Trp	Met	Glu	Arg 360	Phe	Gly	Pro	Asp	Thr 365	Gln	His	Leu
Val	Leu 370	Asn	Glu	Asn	Cys	Ala 375	Ser	Val	His	Asn	Leu 380	Arg	Ser	His	Lys
Ile 385	Gln	Thr	Gln	Leu	Asn 390	Leu	Ile	His	Pro	Asp 395	Ile	Phe	Pro	Leu	Leu 400
Thr	Ser	Phe	Pro	Cys 405	Lys	Lys	Glu	Gly	Pro 410	Thr	Leu	Ser	Val	Pro 415	Met
Val	Gln	Gly	Glu 420	Cys	Leu	Leu	Lys	Tyr 425	Gln	Leu	Arg	Pro	Arg 430	Arg	Glu
Trp	Gln	Arg 435	Asp	Ala	Ile	Ile	Thr 440	Cys	Asn	Pro	Glu	Glu 445	Phe	Ile	Val
Glu	Ala 450	Leu	Gln	Leu	Pro	Asn 455	Phe	Gln	Gln	Ser	Val 460	Gln	Glu	Tyr	Arg
Arg 465	Ser	Val	Gln	Asp	Val 470	Pro	Ala	Pro	Ala	Glu 475	Lys	Arg	Ser	Gln	Tyr 480
Pro	Glu	Ile	Ile	Phe 485	Leu	Gly	Thr	Gly	Ser 490	Ala	Ile	Pro	Met	Lys 495	Ile
Arg	Asn	Val	Ser 500	Ala	Thr	Leu	Val	Asn 505	Ile	Ser	Pro	Asp	Thr 510	Ser	Leu
Leu	Leu	Asp 515	Cys	Gly	Glu	Gly	Thr 520	Phe	Gly	Gln	Leu	Cys 525	Arg	His	Tyr
Gly	Asp 530	Gln	Val	Asp	Arg	Val 535	Leu	Gly	Thr	Leu	Ala 540	Ala	Val	Phe	Val
Ser 545	His	Leu	His	Ala	Asp 550	His	His	Thr	Gly	Leu 555	Leu	Asn	Ile	Leu	Leu 560
Gln	Arg	Glu	Gln	Ala 565	Leu	Ala	Ser	Leu	Gly 570	Lys	Pro	Leu	His	Pro 575	Leu
Leu	Val	Val	Ala 580	Pro	Ser	Gln	Leu	Lys 585	Ala	Trp	Leu	Gln	Gln 590	Tyr	His
Asn	Gln	Cys 595	Gln	Glu	Val	Leu	His 600	His	Ile	Ser	Met	Ile 605	Pro	Ala	Lys
Cys	Leu 610	Gln	Glu	Gly	Ala	Glu 615	Ile	Ser	Ser	Pro	Ala 620	Val	Glu	Arg	Leu
Ile 625	Ser	Ser	Leu	Leu	Arg 630	Thr	Cys	Asp	Leu	Glu 635	Glu	Phe	Gln	Thr	Cys 640

Val Leu Gly Asn Gly Thr Gly Leu Leu Arg Ala Cys Phe Ile Leu Arg
100 105 110

Thr	Pro	Leu	Lys	Thr	Tyr	Met	Phe	Asn	Cys	Pro	Glu	Asn	Ala	Cys	Arg
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Phe	Leu	Trp	Gln	Leu	Arg	Ile	Arg	Ser	Ser	Ser	Val	Val	Asp	Leu	Phe
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Ile	Thr	Ser	Ala	Asn	Trp	Asp	Asn	Ile	Ala	Gly	Ile	Ser	Ser	Ile	Leu
145					150					155					160
Leu	Ser	Lys	Glu	Ser	Asn	Ala	Leu	Ser	Thr	Arg	Leu	His	Gly	Ala	Met
				165					170					175	
Asn	Ile	Lys	His	Phe	Leu	Glu	Cys	Ile	Arg	Pro	Phe	Gln	Asp	Ser	Asp
			180					185					190		
Tyr	Gly	Ser	Cys	Lys	Tyr	Pro	Ser	Gln	Val	Glu	Glu	Arg	Pro	Tyr	Thr
		195					200					205			
Met	Glu	Asn	Tyr	Glu	Asp	Ala	Gly	Leu	Lys	Val	Thr	Tyr	Ile	Pro	Leu
	210					215					220				
Ser	Pro	Pro	Leu	Asn	Ile	Gly	Ser	Asn	Asn	Glu	Lys	Ser	Lys	Asn	Val
225					230					235					240
Lys	Val	Asn	Asn	Val	Asp	Ile	Ala	Phe	Leu	Ile	Glu	Met	Lys	Glu	Ala
				245					250					255	
Ala	Arg	Arg	Ile	Asp	Thr	Met	Lys	Leu	Met	Glu	Leu	Lys	Val	Pro	Lys
			260					265					270		
Gly	Pro	Leu	Ile	Gly	Lys	Leu	Lys	Ser	Gly	Glu	Ala	Val	Thr	Leu	Pro
		275					280					285			
Asp	Gly	Arg	Thr	Ile	Gln	Pro	Asp	Gln	Val	Phe	Ser	Ser	Asp	Lys	Val
	290					295					300				
Glu	Gly	Asp	Lys	Pro	Leu	Leu	Leu	Val	Thr	Glu	Cys	Thr	Thr	Glu	Asp
305					310					315					320
His	Val	Lys	Ala	Leu	Ile	Asp	Ser	Ser	Ser	Leu	Gln	Pro	Phe	Leu	Asn
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Gly	Glu	Lys	Gln	Leu	Asp	Tyr	Met	Val	His	Ile	Ser	Asp	Asp	Ala	Val
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Ile	Asn	Thr	Pro	Thr	Tyr	Arg	His	Leu	Met	Glu	Lys	Leu	Asn	Asn	Pro
		355					360					365			
Ser	Ile	Thr	His	Leu	Leu	Ile	Asn	Gly	Gly	Asn	Pro	Val	Ile	Pro	Ala
	370					375					380				
Val	Glu	Ser	Val	Tyr	Lys	His	Thr	Arg	Leu	Leu	Arg	Ser	Ile	Ala	Pro
385					390					395					400
Ser	Leu	Phe	Pro	Ala	Leu	His	Pro	Ile	Asp	Trp	Ser	Gly	Ile	Ile	Thr
				405					410					415	
Gln	Asn	Glu	Glu	Leu	Ser	Gln	Arg	Gln	Asp	Gln	Phe	Ile	Arg	Val	Ala
			420					425					430		
Pro	Met	Gln	Arg	Tyr	Trp	Met	Arg	Arg	Gly	Ala	Ser	Phe	Asn	Glu	Glu
		435					440					445			

Pro	Ile	Val	Asn	Asn	Leu	Leu	Ala	Ala	Glu	Pro	Glu	Leu	Ser	Asp	Lys
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Ala	Lys	Glu	Leu	Ile	Lys	Glu	Tyr	Gln	Lys	Leu	Glu	Lys	Glu	Asn	Lys
465					470					475					480
Met	Asp	Cys	Glu	Phe	Pro	Lys	Leu	Thr	Phe	Phe	Gly	Thr	Ser	Ser	Ala
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Val	Pro	Ser	Lys	Tyr	Arg	Asn	Val	Thr	Gly	Tyr	Leu	Val	Glu	Ala	Ser
			500					505					510		
Glu	Asn	Ser	Ala	Ile	Leu	Ile	Asp	Val	Gly	Glu	Gly	Thr	Tyr	Gly	Gln
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Met	Arg	Ala	Val	Phe	Gly	Glu	Asp	Gly	Cys	Lys	Gln	Leu	Leu	Val	Asn
	530					535					540				
Leu	Asn	Cys	Val	Leu	Ile	Thr	His	Ala	His	Gln	Asp	His	Met	Asn	Gly
545					550					555					560
Leu	Tyr	Thr	Ile	Ile	Ala	Arg	Arg	Lys	Glu	Ala	Phe	Glu	Ser	Leu	Gly
				565					570					575	
Ala	Pro	Tyr	Arg	Pro	Leu	Val	Leu	Val	Cys	Asn	Arg	Asn	Val	Leu	Lys
			580					585					590		
Pro	Met	Lys	Thr	Tyr	Ser	Ile	Cys	Phe	Glu	Asn	Ile	Glu	His	Leu	Leu
		595					600					605			
Glu	Ile	Val	Asp	Ile	Ser	Arg	Tyr	Pro	Leu	Thr	Pro	Pro	Gly	Ser	Pro
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Gly	Gly	Pro	Pro	Gly	Lys	Arg	Pro	Arg	Leu	Pro	Ser	Pro	His	Leu	Pro
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Pro	Ser	Arg	Asp	Val	Leu	Gln	Asp	Met	Ser	Ser	Ser	Phe	Asp	Lys	Lys
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Ala	Trp	Lys	Leu	Asp	Glu	Leu	Lys	Ala	Val	Gln	Val	His	His	Thr	Arg
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Met	Ala	Asn	Gly	Phe	Val	Met	Arg	Val	Ala	Gly	Lys	Arg	Ile	Val	Phe
		675					680					685			
Ser	Gly	Asp	Thr	Lys	Pro	Cys	Asp	Leu	Leu	Val	Glu	Glu	Gly	Lys	Asp
	690					695					700				
Ala	Asp	Val	Leu	Val	His	Glu	Ser	Thr	Phe	Glu	Asp	Gly	His	Glu	Val
705					710					715					720
Asp	Met	Thr	Pro	Lys	Pro	Pro	Lys	Lys	Leu	Ala	Lys	Ile	Ser	Ser	Leu
				725					730					735	
Ala	Asp	Ala	Met	Arg	Lys	Arg	His	Ser	Thr	Met	Gly	Gln	Ala	Val	Asp
			740					745					750		
Val	Gly	Lys	Arg	Met	Asn	Ala	Lys	His	Ile	Ile	Leu	Thr	His	Phe	Ser
		755					760					765			
Ala	Arg	Tyr	Pro	Lys	Val	Pro	Val	Leu	Pro	Glu	Tyr	Leu	Asp	Lys	Glu
	770					775					780				

Gly	Glu	Ser	Val	Lys 245	Ser	Asp	Glu	Arg	Asp 250	Ile	Thr	Val	His	Pro 255	Ser
Asp	Val	Met	Gly 260	Pro	Ser	Leu	Pro	Gly 265	Pro	Ile	Val	Leu	Leu 270	Val	Asp
Cys	Pro	Thr 275	Glu	Ser	His	Ala	Ala 280	Glu	Leu	Phe	Ser	Leu 285	Lys	Ser	Leu
Glu	Ser 290	Tyr	Tyr	Ser	Ser	Pro 295	Asp	Glu	Gln	Thr	Ile 300	Gly	Ala	Lys	Phe
Val 305	Asn	Cys	Ile	Ile	His 310	Leu	Ser	Pro	Ser	Ser 315	Val	Thr	Ser	Ser	Pro 320
Thr	Tyr	Gln	Ser	Trp 325	Met	Lys	Lys	Phe	His 330	Leu	Thr	Gln	His	Ile 335	Leu
Ala	Gly	His	Gln 340	Arg	Phe	Leu	Pro	Leu 345	Leu	Ile	Ile	Val	Ser 350	His	Gln
Lys	Thr	Val 355	Arg	Lys	Asn	Met	Ala 360	Phe	Pro	Ile	Leu	Lys 365	Ala	Ser	Ser
Arg	Ile 370	Ala	Ala	Arg	Leu	Asn 375	Tyr	Leu	Cys	Pro	Gln 380	Phe	Phe	Pro	Ala
Pro 385	Gly	Phe	Trp	Pro	Ser 390	Gln	Leu	Thr	Asp	Asn 395	Ser	Ile	Ile	Asp	Pro 400
Thr	Pro	Ser	Asn	Lys 405	Phe	Asn	Leu	Arg	Pro 410	Val	Ala	Ile	Arg	Gly 415	Ile
Asp	Arg	Ser	Cys 420	Ile	Pro	Ala	Pro	Leu 425	Thr	Ser	Ser	Glu	Val 430	Val	Asp
Glu	Leu	Leu 435	Ser	Glu	Ile	Pro	Glu 440	Ile	Lys	Asp	Lys	Ser 445	Glu	Glu	Ile
Lys	Gln 450	Phe	Trp	Asn	Lys	Gln 455	His	Asn	Lys	Thr	Ile 460	Ile	Glu	Lys	Leu
Trp 465	Leu	Ser	Glu	Cys	Asn 470	Thr	Val	Leu	Pro	Asn 475	Cys	Leu	Glu	Lys	Ile 480
Arg	Arg	Asp	Asp	Met 485	Glu	Ile	Val	Ile	Leu 490	Gly	Thr	Gly	Ser	Ser 495	Gln
Pro	Ser	Lys	Tyr 500	Arg	Asn	Val	Ser	Ala 505	Ile	Phe	Ile	Asp	Leu 510	Phe	Ser
Arg	Gly	Ser 515	Leu	Leu	Leu	Asp	Cys 520	Gly	Glu	Gly	Thr	Leu 525	Gly	Gln	Leu
Lys	Arg 530	Arg	Tyr	Gly	Leu	Asp 535	Gly	Ala	Asp	Glu	Ala 540	Val	Arg	Lys	Leu
Arg 545	Cys	Ile	Trp	Ile	Ser 550	His	Ile	His	Ala	Asp 555	His	His	Thr	Gly	Leu 560
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Pro Leu Leu Leu Val Gln Ser Ala His Gly Glu Lys Tyr Phe Phe Gly
      20                25                30

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Lys	Ile	Gly	Glu	Gly	Ser	Gln	Arg	Ser	Leu	Thr	Glu	Asn	Lys	Ile	Arg
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Ile	Ser	Lys	Leu	Lys	Asp	Ile	Phe	Leu	Thr	Gly	Glu	Leu	Asn	Trp	Ser
	50					55					60				
Asp	Ile	Gly	Gly	Leu	Pro	Gly	Met	Ile	Leu	Thr	Ile	Ala	Asp	Gln	Gly
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Lys	Ser	Asn	Leu	Val	Leu	His	Tyr	Gly	Asn	Asp	Ile	Leu	Asn	Tyr	Ile
				85					90					95	
Val	Ser	Thr	Trp	Arg	Tyr	Phe	Val	Phe	Arg	Phe	Gly	Ile	Asp	Leu	Asn
			100					105					110		
Asp	His	Ile	Met	Lys	Asp	Lys	Glu	Val	Tyr	Lys	Asp	Lys	Ile	Ile	Ala
		115					120					125			
Val	Lys	Ser	Phe	Asn	Val	Leu	Lys	Asn	Gly	Gly	Glu	Asp	Arg	Leu	Gly
	130					135					140				
Val	Phe	Asp	Ser	Phe	Gln	Lys	Gly	Val	Leu	Arg	Ser	Ile	Val	Ala	Lys
145					150					155					160
Met	Phe	Pro	Lys	His	Ala	Pro	Thr	Asp	Arg	Tyr	Asp	Pro	Ser	Ser	Asp
				165					170					175	
Pro	His	Leu	Asn	Val	Glu	Leu	Pro	Asp	Leu	Asp	Ala	Lys	Val	Glu	Val
			180					185					190		
Ser	Thr	Asn	Tyr	Glu	Ile	Ser	Phe	Ser	Pro	Val	Arg	Gly	Lys	Phe	Lys
		195					200					205			
Val	Glu	Glu	Ala	Ile	Lys	Leu	Gly	Val	Pro	Lys	Gly	Pro	Leu	Phe	Ala
	210					215					220				
Lys	Leu	Thr	Lys	Gly	Gln	Thr	Ile	Thr	Leu	Asp	Asn	Gly	Ile	Val	Val
225					230					235					240
Thr	Pro	Glu	Gln	Val	Leu	Glu	Asn	Glu	Arg	His	Phe	Ala	Lys	Val	Leu
				245					250					255	
Ile	Leu	Asp	Ile	Pro	Asp	Asp	Leu	Tyr	Leu	Asn	Ala	Phe	Val	Glu	Lys
			260					265					270		
Phe	Lys	Asp	Tyr	Asp	Cys	Ala	Glu	Leu	Gly	Met	Val	Tyr	Tyr	Phe	Leu
		275					280					285			
Gly	Asp	Glu	Val	Thr	Ile	Asn	Asp	Asn	Leu	Phe	Ala	Phe	Ile	Asp	Ile
	290					295					300				
Phe	Glu	Lys	Asn	Asn	Tyr	Gly	Lys	Val	Asn	His	Met	Ile	Ser	His	Asn
305					310					315					320
Lys	Ile	Ser	Pro	Asn	Thr	Ile	Ser	Phe	Phe	Gly	Ser	Ala	Leu	Thr	Thr
				325					330					335	
Leu	Lys	Leu	Lys	Ala	Leu	Gln	Val	Asn	Asn	Tyr	Asn	Leu	Pro	Lys	Thr
			340					345					350		
Asp	Arg	Val	Phe	Ser	Lys	Asp	Phe	Tyr	Asp	Arg	Phe	Asp	Thr	Pro	Leu
		355					360					365			

Ser Arg Gly Thr Ser Met Cys Lys Ser Gln Glu Glu Pro Leu Asn Thr
 370 375 380
 Ile Ile Glu Lys Asp Asn Ile His Ile Phe Ser Gln Asn Lys Thr Val
 385 390 395 400
 Thr Phe Glu Pro Phe Arg Met Asn Glu Glu Pro Met Lys Cys Asn Ile
 405 410 415
 Asn Gly Glu Val Ala Asp Phe Ser Trp Gln Glu Ile Phe Glu Glu His
 420 425 430
 Val Lys Pro Leu Glu Phe Pro Leu Ala Asp Val Asp Thr Val Ile Asn
 435 440 445
 Asn Gln Leu His Val Asp Asn Phe Asn Asn Ser Ala Glu Lys Lys Lys
 450 455 460
 His Val Glu Ile Ile Thr Leu Gly Thr Gly Ser Ala Leu Pro Ser Lys
 465 470 475 480
 Tyr Arg Asn Val Val Ser Thr Leu Val Lys Val Pro Phe Thr Asp Ala
 485 490 495
 Asp Gly Asn Thr Ile Asn Arg Asn Ile Met Leu Asp Ala Gly Glu Asn
 500 505 510
 Thr Leu Gly Thr Ile His Arg Met Phe Ser Gln Leu Ala Val Lys Ser
 515 520 525
 Ile Phe Gln Asp Leu Lys Met Ile Tyr Leu Ser His Leu His Ala Asp
 530 535 540
 His His Leu Gly Ile Ile Ser Val Leu Asn Glu Trp Tyr Lys Tyr Asn
 545 550 555 560
 Lys Asp Asp Glu Thr Ser Tyr Ile Tyr Val Val Thr Pro Trp Gln Tyr
 565 570 575
 His Lys Phe Val Asn Glu Trp Leu Val Leu Glu Asn Lys Glu Ile Leu
 580 585 590
 Lys Arg Ile Lys Tyr Ile Ser Cys Glu His Phe Ile Asn Asp Ser Phe
 595 600 605
 Val Arg Met Gln Thr Gln Ser Val Pro Leu Ala Glu Phe Asn Glu Ile
 610 615 620
 Leu Lys Glu Asn Ser Asn Gln Glu Ser Asn Arg Lys Leu Glu Leu Asp
 625 630 635 640
 Arg Asp Ser Ser Tyr Arg Asp Val Asp Leu Ile Arg Gln Met Tyr Glu
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 Asp Leu Ser Ile Glu Tyr Phe Gln Thr Cys Arg Ala Ile His Cys Asp
 660 665 670
 Trp Ala Tyr Ser Asn Ser Ile Thr Phe Arg Met Asp Glu Asn Asn Glu
 675 680 685
 His Asn Thr Phe Lys Val Ser Tyr Ser Gly Asp Thr Arg Pro Asn Ile
 690 695 700

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Glu Lys Phe Ser Leu Glu Ile Gly Tyr Asn Ser Asp Leu Leu Ile His
 705 710 715 720
 Glu Ala Thr Leu Glu Asn Gln Leu Leu Glu Asp Ala Val Lys Lys Lys
 725 730 735
 His Cys Thr Ile Asn Glu Ala Ile Gly Val Ser Asn Lys Met Asn Ala
 740 745 750
 Arg Lys Leu Ile Leu Thr His Phe Ser Gln Arg Tyr Pro Lys Leu Pro
 755 760 765
 Gln Leu Asp Asn Asn Ile Asp Val Met Ala Arg Glu Phe Cys Phe Ala
 770 775 780
 Phe Asp Ser Met Ile Val Asp Tyr Glu Lys Ile Gly Glu Gln Gln Arg
 785 790 795 800
 Ile Phe Pro Leu Leu Asn Lys Ala Phe Val Glu Glu Lys Glu Glu Glu
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 Glu Asp Val Asp Asp Val Glu Ser Val Gln Asp Leu Glu Val Lys Leu
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 Lys Lys His Lys Lys Asn
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<211> 311

<212> PRT

<213> Escherichia coli

<400> 230

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 Gln His Pro Thr Gln Ser Gly Leu Trp Leu Phe Asp Cys Gly Glu Gly
 35 40 45
 Thr Gln His Gln Leu Leu His Thr Ala Phe Asn Pro Gly Lys Leu Asp
 50 55 60
 Lys Ile Phe Ile Ser His Leu His Gly Asp His Leu Phe Gly Leu Pro
 65 70 75 80
 Gly Leu Leu Cys Ser Arg Ser Met Ser Gly Ile Ile Gln Pro Leu Thr
 85 90 95
 Ile Tyr Gly Pro Gln Gly Ile Arg Glu Phe Val Glu Thr Ala Leu Arg
 100 105 110
 Ile Ser Gly Ser Trp Thr Asp Tyr Pro Leu Glu Ile Val Glu Ile Gly
 115 120 125
 Ala Gly Glu Ile Leu Asp Asp Gly Leu Arg Lys Val Thr Ala Tyr Pro
 130 135 140
 Leu Glu His Pro Leu Glu Cys Tyr Gly Tyr Arg Ile Glu Glu His Asp
 145 150 155 160

09080808
 112001

Lys	Pro	Gly	Ala	Leu	Asn	Ala	Gln	Ala	Leu	Lys	Ala	Ala	Gly	Val	Pro
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Pro	Gly	Pro	Leu	Phe	Gln	Glu	Leu	Lys	Ala	Gly	Lys	Thr	Ile	Thr	Leu
			180					185					190		
Glu	Asp	Gly	Arg	Gln	Ile	Asn	Gly	Ala	Asp	Tyr	Leu	Ala	Ala	Pro	Val
		195					200					205			
Pro	Gly	Lys	Ala	Leu	Ala	Ile	Phe	Gly	Asp	Thr	Gly	Pro	Cys	Asp	Ala
	210					215					220				
Ala	Leu	Asp	Leu	Ala	Lys	Gly	Val	Asp	Val	Met	Val	His	Glu	Ala	Thr
225					230					235					240
Leu	Asp	Ile	Thr	Met	Glu	Ala	Lys	Ala	Asn	Ser	Arg	Gly	His	Ser	Ser
				245					250					255	
Thr	Arg	Gln	Ala	Ala	Thr	Leu	Ala	Arg	Glu	Ala	Gly	Val	Gly	Lys	Leu
			260					265					270		
Ile	Ile	Thr	His	Val	Ser	Ser	Arg	Tyr	Asp	Asp	Lys	Gly	Cys	Gln	His
		275					280					285			
Leu	Leu	Arg	Glu	Cys	Arg	Ser	Ile	Phe	Pro	Ala	Thr	Glu	Leu	Ala	Asn
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Asp	Phe	Thr	Val	Phe	Asn	Val									
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Trp	Leu	Phe	Asp	Cys	Gly	Glu	Gly	Thr	Gln	His	Gln	Phe	Leu	Arg	Ser
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Gly	Asp	His	Ile	Phe	Gly	Leu	Met	Gly	Leu	Leu	Ala	Ser	Ser	Gly	Leu
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Ala	Gly	Ser	Gly	Gln	Gly	Ile	Glu	Ile	Tyr	Gly	Pro	Glu	Gly	Leu	Gly
				85					90					95	
Asp	Tyr	Leu	Glu	Ala	Cys	Cys	Arg	Phe	Ser	Ser	Thr	His	Leu	Gly	Lys
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Arg	Leu	Lys	Val	His	Thr	Val	Arg	Glu	Asn	Gly	Leu	Ile	Tyr	Glu	Asp
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Lys	Asp	Phe	Gln	Val	His	Cys	Gly	Leu	Leu	Lys	His	Arg	Ile	Pro	Ala
	130					135					140				

Tyr Gly Tyr Arg Val Glu Glu Lys Gln Arg Pro Gly Arg Phe Asn Val
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 Glu Gln Ala Glu Ala Leu Gly Ile Pro Phe Gly Pro Ile Tyr Gly Gln
 165 170 175
 Leu Lys Gln Gly Lys Thr Val Thr Leu Glu Asp Gly Arg Arg Ile Arg
 180 185 190
 Gly Gln Asp Leu Cys Glu Pro Pro Glu Pro Gly Arg Lys Phe Val Tyr
 195 200 205
 Cys Thr Asp Thr Val Phe Cys Glu Glu Ala Ile Ala Leu Ala Gln Glu
 210 215 220
 Ala Asp Leu Leu Val His Glu Ala Thr Phe Ala His Gln Asp Ala Gln
 225 230 235 240
 Leu Ala Phe Asp Arg Leu His Ser Thr Ser Thr Met Ala Ala Gln Val
 245 250 255
 Ala Leu Leu Ala Asn Val Lys Gln Leu Ile Met Thr His Phe Ser Pro
 260 265 270
 Arg Tyr Ala Pro Gly Asn Pro Leu Gln Leu Glu Asn Leu Leu Ala Glu
 275 280 285
 Ala Gln Ala Ile Phe Pro Asn Thr Arg Leu Ala Arg Asp Phe Leu Thr
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 Ile Ser Pro Met Lys Val Thr Arg Ile Phe Ile Thr His Leu His Gly
 50 55 60
 Asp His Ile Leu Gly Ile Pro Gly Met Ile Gln Ser Met Gly Phe Arg
 65 70 75 80
 Gly Arg Glu Glu Pro Leu Asp Ile Tyr Gly Pro Pro Gly Ile His Glu
 85 90 95
 Leu His Glu Cys Ile Met Lys Met Gly Tyr Phe Thr Leu Asp Phe Asp
 100 105 110

00906607 112004

Ile Asn Val His Glu Val Arg Gly Gly Thr Val Val Glu Glu Asp Asp
115 120 125

Tyr Arg Val Thr Ser Ala Pro Ala Ser His Ser Val Phe Asn Leu Ala
130 135 140

Tyr Cys Phe Glu Glu Lys Lys Arg Pro Arg Phe Leu Arg Glu Lys Ala
145 150 155 160

Ile Ala Leu Gly Leu Lys Pro Gly Pro Ala Phe Gly Lys Leu His Arg
165 170 175

Gly Ile Pro Val Arg Val Gly Asp Arg Ile Ile Met Pro Glu Glu Val
180 185 190

Leu Gly Ser Pro Arg Lys Gly Val Lys Val Cys Tyr Ser Gly Asp Thr
195 200 205

Arg Pro Cys Glu Ser Val Ile Lys Leu Ala Glu Gly Ala Glu Leu Leu
210 215 220

Ile His Glu Ser Thr Leu Glu Ala Gly Ser Glu Asp Lys Ala Ala Glu
225 230 235 240

Ser Gly His Ser Thr Ala Arg Glu Ala Ala Glu Val Ala Arg Ser Ala
245 250 255

Gly Val Lys Arg Leu Ile Leu Thr His Leu Ser Thr Arg Tyr Lys Arg
260 265 270

Thr Glu Val Ile Leu Glu Ala Ala Arg Gln Val Phe Pro Val Thr Asp
275 280 285

Val Ala Asp Asp Leu Met Thr Val Glu Val Lys Ala Tyr Asp Ser Ser
290 295 300

Pro Asp Ser
305

<210> 233

<211> 684

<212> PRT

<213> Homo sapiens

<400> 233

Met Ser Ala Ile Pro Ala Glu Glu Ser Asp Gln Leu Leu Ile Arg Pro
1 5 10 15

Leu Gly Ala Gly Gln Glu Val Gly Arg Ser Cys Ile Ile Leu Glu Phe
20 25 30

Lys Gly Arg Lys Ile Met Leu Asp Cys Gly Ile His Pro Gly Leu Glu
35 40 45

Gly Met Asp Ala Leu Pro Tyr Ile Asp Leu Ile Asp Pro Ala Glu Ile
50 55 60

Asp Leu Leu Leu Ile Ser His Phe His Leu Asp His Cys Gly Ala Leu
65 70 75 80

Pro Trp Phe Leu Gln Lys Thr Ser Phe Lys Gly Arg Thr Phe Met Thr
85 90 95

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His Ala Thr Lys Ala Ile Tyr Arg Trp Leu Leu Ser Asp Tyr Val Lys
 100 105 110
 Val Ser Asn Ile Ser Ala Asp Asp Met Leu Tyr Thr Glu Thr Asp Leu
 115 120 125
 Glu Glu Ser Met Asp Lys Ile Glu Thr Ile Asn Phe His Glu Val Lys
 130 135 140
 Glu Val Ala Gly Ile Lys Phe Trp Cys Tyr His Ala Gly His Val Leu
 145 150 155 160
 Gly Ala Ala Met Phe Met Ile Glu Ile Ala Gly Val Lys Leu Leu Tyr
 165 170 175
 Thr Gly Asp Phe Ser Arg Gln Glu Asp Arg His Leu Met Ala Ala Glu
 180 185 190
 Ile Pro Asn Ile Lys Pro Asp Ile Leu Ile Ile Glu Ser Thr Tyr Gly
 195 200 205
 Thr His Ile His Glu Lys Arg Glu Glu Arg Glu Ala Arg Phe Cys Asn
 210 215 220
 Thr Val His Asp Ile Val Asn Arg Gly Gly Arg Gly Leu Ile Pro Val
 225 230 235 240
 Phe Ala Leu Gly Arg Ala Gln Glu Leu Leu Leu Ile Leu Asp Glu Tyr
 245 250 255
 Trp Gln Asn His Pro Glu Leu His Asp Ile Pro Ile Tyr Tyr Ala Ser
 260 265 270
 Ser Leu Ala Lys Lys Cys Met Ala Val Tyr Gln Thr Tyr Val Asn Ala
 275 280 285
 Met Asn Asp Lys Ile Arg Lys Gln Ile Asn Ile Asn Asn Pro Phe Val
 290 295 300
 Phe Lys His Ile Ser Asn Leu Lys Ser Met Asp His Phe Asp Asp Ile
 305 310 315 320
 Gly Pro Ser Val Val Met Ala Ser Pro Gly Met Met Gln Ser Gly Leu
 325 330 335
 Ser Arg Glu Leu Phe Glu Ser Trp Cys Thr Asp Lys Arg Asn Gly Val
 340 345 350
 Ile Ile Ala Gly Tyr Cys Val Glu Gly Thr Leu Ala Lys His Ile Met
 355 360 365
 Ser Glu Pro Glu Glu Ile Thr Thr Met Ser Gly Gln Lys Leu Pro Leu
 370 375 380
 Lys Met Ser Val Asp Tyr Ile Ser Phe Ser Ala His Thr Asp Tyr Gln
 385 390 395 400
 Gln Thr Ser Glu Phe Ile Arg Ala Leu Lys Pro Pro His Val Ile Leu
 405 410 415
 Val His Gly Glu Gln Asn Glu Met Ala Arg Leu Lys Ala Ala Leu Ile
 420 425 430

09988637-112001

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<210> 234
<211> 693
<212> PRT
<213> Arabidopsis thaliana
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<400> 234
Met Ala Ser Ser Ser Thr Ser Leu Lys Arg Arg Glu Gln Pro Ile Ser
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Arg Asp Gly Asp Gln Leu Ile Val Thr Pro Leu Gly Ala Gly Ser Glu
      20             25             30
Val Gly Arg Ser Cys Val Tyr Met Ser Phe Arg Gly Lys Asn Ile Leu
      35             40             45

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Phe	Asp	Cys	Gly	Ile	His	Pro	Ala	Tyr	Ser	Gly	Met	Ala	Ala	Leu	Pro	
50						55					60					
Tyr	Phe	Asp	Glu	Ile	Asp	Pro	Ser	Ser	Ile	Asp	Val	Leu	Leu	Ile	Thr	
65					70					75					80	
His	Phe	His	Ile	Asp	His	Ala	Ala	Ser	Leu	Pro	Tyr	Phe	Leu	Glu	Lys	
				85					90					95		
Thr	Thr	Phe	Asn	Gly	Arg	Val	Phe	Met	Thr	His	Ala	Thr	Lys	Ala	Ile	
			100					105					110			
Tyr	Lys	Leu	Leu	Leu	Thr	Asp	Tyr	Val	Lys	Val	Ser	Lys	Val	Ser	Val	
		115					120					125				
Glu	Asp	Met	Leu	Phe	Asp	Glu	Gln	Asp	Ile	Asn	Lys	Ser	Met	Asp	Lys	
	130					135					140					
Ile	Glu	Val	Ile	Asp	Phe	His	Gln	Thr	Val	Glu	Val	Asn	Gly	Ile	Lys	
145					150					155					160	
Phe	Trp	Cys	Tyr	Thr	Ala	Gly	His	Val	Leu	Gly	Ala	Ala	Met	Phe	Met	
				165					170					175		
Val	Asp	Ile	Ala	Gly	Val	Arg	Ile	Leu	Tyr	Thr	Gly	Asp	Tyr	Ser	Arg	
			180					185					190			
Glu	Glu	Asp	Arg	His	Leu	Arg	Ala	Ala	Glu	Leu	Pro	Gln	Phe	Ser	Pro	
		195					200					205				
Asp	Ile	Cys	Ile	Ile	Glu	Ser	Thr	Ser	Gly	Val	Gln	Leu	His	Gln	Ser	
	210					215					220					
Arg	His	Ile	Arg	Glu	Lys	Arg	Phe	Thr	Asp	Val	Ile	His	Ser	Thr	Val	
225					230					235					240	
Ala	Gln	Gly	Gly	Arg	Val	Leu	Ile	Pro	Ala	Phe	Ala	Leu	Gly	Arg	Ala	
				245					250					255		
Gln	Glu	Leu	Leu	Leu	Ile	Leu	Asp	Glu	Tyr	Trp	Ala	Asn	His	Pro	Asp	
		260						265					270			
Leu	His	Asn	Ile	Pro	Ile	Tyr	Tyr	Ala	Ser	Pro	Leu	Ala	Lys	Lys	Cys	
		275					280					285				
Met	Ala	Val	Tyr	Gln	Thr	Tyr	Ile	Leu	Ser	Met	Asn	Asp	Arg	Ile	Arg	
	290					295					300					
Asn	Gln	Phe	Ala	Asn	Ser	Asn	Pro	Phe	Val	Phe	Lys	His	Ile	Ser	Pro	
305					310					315					320	
Leu	Asn	Ser	Ile	Asp	Asp	Phe	Asn	Asp	Val	Gly	Pro	Ser	Val	Val	Met	
				325					330					335		
Ala	Thr	Pro	Gly	Gly	Leu	Gln	Ser	Gly	Leu	Ser	Arg	Gln	Leu	Phe	Asp	
			340					345					350			
Ser	Trp	Cys	Ser	Asp	Lys	Lys	Asn	Ala	Cys	Ile	Ile	Pro	Gly	Tyr	Met	
		355					360					365				
Val	Glu	Gly	Thr	Leu	Ala	Lys	Thr	Ile	Ile	Asn	Glu	Pro	Lys	Glu	Val	
	370					375					380					

Thr Leu Met Asn Gly Leu Thr Ala Pro Leu Asn Met Gln Val His Tyr
 385 390 395 400
 Ile Ser Phe Ser Ala His Ala Asp Tyr Ala Gln Thr Ser Thr Phe Leu
 405 410 415
 Lys Glu Leu Met Pro Pro Asn Ile Ile Leu Val His Gly Glu Ala Asn
 420 425 430
 Glu Met Met Arg Leu Lys Gln Lys Leu Leu Thr Glu Phe Pro Asp Gly
 435 440 445
 Asn Thr Lys Ile Met Thr Pro Lys Asn Cys Glu Ser Val Glu Met Tyr
 450 455 460
 Phe Asn Ser Glu Lys Leu Ala Lys Thr Ile Gly Arg Leu Ala Glu Lys
 465 470 475 480
 Thr Pro Asp Val Gly Asp Thr Val Ser Gly Ile Leu Val Lys Lys Gly
 485 490 495
 Phe Thr Tyr Gln Ile Met Ala Pro Asp Glu Leu His Val Phe Ser Gln
 500 505 510
 Leu Ser Thr Ala Thr Val Thr Gln Arg Ile Thr Ile Pro Phe Val Gly
 515 520 525
 Ala Phe Gly Val Ile Lys His Arg Leu Glu Lys Ile Phe Glu Ser Val
 530 535 540
 Glu Phe Ser Thr Asp Glu Glu Ser Gly Leu Pro Ala Leu Lys Val His
 545 550 555 560
 Glu Arg Val Thr Val Lys Gln Glu Ser Glu Lys His Ile Ser Leu Gln
 565 570 575
 Trp Ser Ser Asp Pro Ile Ser Asp Met Val Ser Asp Ser Ile Val Ala
 580 585 590
 Leu Ile Leu Asn Ile Ser Arg Glu Val Pro Lys Ile Val Met Glu Glu
 595 600 605
 Glu Asp Ala Val Lys Ser Glu Glu Glu Asn Gly Lys Lys Val Glu Lys
 610 615 620
 Val Ile Tyr Ala Leu Leu Val Ser Leu Phe Gly Asp Val Lys Leu Gly
 625 630 635 640
 Glu Asn Gly Lys Leu Val Ile Arg Val Asp Gly Asn Val Ala Gln Leu
 645 650 655
 Asp Lys Glu Ser Gly Glu Val Glu Ser Glu His Ser Gly Leu Lys Glu
 660 665 670
 Arg Val Arg Val Ala Phe Glu Arg Ile Gln Ser Ala Val Lys Pro Ile
 675 680 685
 Pro Leu Ser Ala Ser
 690

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 20037 209888660

<400> 235																
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Ser	Asn	Glu	Val	Gly	Arg	Ser	Cys	His	Ile	Leu	Gln	Tyr	Lys	Gly	Lys	
			20					25					30			
Thr	Val	Met	Leu	Asp	Ala	Gly	Ile	His	Pro	Ala	Tyr	Gln	Gly	Leu	Ala	
		35				40						45				
Ser	Leu	Pro	Phe	Tyr	Asp	Glu	Phe	Asp	Leu	Ser	Lys	Val	Asp	Ile	Leu	
	50					55					60					
Leu	Ile	Ser	His	Phe	His	Leu	Asp	His	Ala	Ala	Ser	Leu	Pro	Tyr	Val	
65					70					75					80	
Met	Gln	Arg	Thr	Asn	Phe	Gln	Gly	Arg	Val	Phe	Met	Thr	His	Pro	Thr	
				85					90					95		
Lys	Ala	Ile	Tyr	Arg	Trp	Leu	Leu	Arg	Asp	Phe	Val	Arg	Val	Thr	Ser	
			100					105					110			
Ile	Gly	Ser	Ser	Ser	Ser	Ser	Met	Gly	Thr	Lys	Asp	Glu	Gly	Leu	Phe	
		115					120					125				
Ser	Asp	Glu	Asp	Leu	Val	Asp	Ser	Phe	Asp	Lys	Ile	Glu	Thr	Val	Asp	
	130					135					140					
Tyr	His	Ser	Thr	Val	Asp	Val	Asn	Gly	Ile	Lys	Phe	Thr	Ala	Phe	His	
145					150					155					160	
Ala	Gly	His	Val	Leu	Gly	Ala	Ala	Met	Phe	Gln	Ile	Glu	Ile	Ala	Gly	
				165					170					175		
Leu	Arg	Val	Leu	Phe	Thr	Gly	Asp	Tyr	Ser	Arg	Glu	Val	Asp	Arg	His	
			180					185					190			
Leu	Asn	Ser	Ala	Glu	Val	Pro	Pro	Leu	Ser	Ser	Asn	Val	Leu	Ile	Val	
		195					200					205				
Glu	Ser	Thr	Phe	Gly	Thr	Ala	Thr	His	Glu	Pro	Arg	Leu	Asn	Arg	Glu	
	210					215					220					
Arg	Lys	Leu	Thr	Gln	Leu	Ile	His	Ser	Thr	Val	Met	Arg	Gly	Gly	Arg	
225					230					235					240	
Val	Leu	Leu	Pro	Val	Phe	Ala	Leu	Gly	Arg	Ala	Gln	Glu	Ile	Met	Leu	
				245					250					255		
Ile	Leu	Asp	Glu	Tyr	Trp	Ser	Gln	His	Ala	Asp	Glu	Leu	Gly	Gly	Gly	
		260						265					270			
Gln	Val	Pro	Ile	Phe	Tyr	Ala	Ser	Asn	Leu	Ala	Lys	Lys	Cys	Met	Ser	
		275					280					285				
Val	Phe	Gln	Thr	Tyr	Val	Asn	Met	Met	Asn	Asp	Asp	Ile	Arg	Lys	Lys	
	290					295					300					

Phe 305	Arg	Asp	Ser	Gln	Thr 310	Asn	Pro	Phe	Ile	Phe 315	Lys	Asn	Ile	Ser	Tyr 320
Leu	Arg	Asn	Leu	Glu 325	Asp	Phe	Gln	Asp	Phe 330	Gly	Pro	Ser	Val	Met 335	Leu
Ala	Ser	Pro	Gly 340	Met	Leu	Gln	Ser	Gly 345	Leu	Ser	Arg	Asp	Leu 350	Leu	Glu
Arg	Trp	Cys 355	Pro	Glu	Asp	Lys	Asn 360	Leu	Val	Leu	Ile	Thr 365	Gly	Tyr	Ser
Ile	Glu 370	Gly	Thr	Met	Ala	Lys 375	Phe	Ile	Met	Leu	Glu 380	Pro	Asp	Thr	Ile
Pro 385	Ser	Ile	Asn	Asn	Pro 390	Glu	Ile	Thr	Ile	Pro 395	Arg	Arg	Cys	Gln	Val 400
Glu	Glu	Ile	Ser	Phe 405	Ala	Ala	His	Val	Asp 410	Phe	Gln	Glu	Asn	Leu 415	Glu
Phe	Ile	Glu	Lys 420	Ile	Ser	Ala	Pro	Asn 425	Ile	Ile	Leu	Val	His 430	Gly	Glu
Ala	Asn	Pro 435	Met	Gly	Arg	Leu	Lys 440	Ser	Ala	Leu	Leu	Ser 445	Asn	Phe	Ala
Ser	Leu 450	Lys	Gly	Thr	Asp	Asn 455	Glu	Val	His	Val	Phe 460	Asn	Pro	Arg	Asn
Cys 465	Val	Glu	Val	Asp	Leu 470	Glu	Phe	Gln	Gly	Val 475	Lys	Val	Ala	Lys	Ala 480
Val	Gly	Asn	Ile	Val 485	Asn	Glu	Ile	Tyr	Lys 490	Glu	Glu	Asn	Val	Glu 495	Ile
Lys	Glu	Glu	Ile 500	Ala	Ala	Lys	Ile	Glu 505	Pro	Ile	Lys	Glu	Glu 510	Asn	Glu
Asp	Asn	Leu 515	Asp	Ser	Gln	Ala	Glu 520	Lys	Gly	Leu	Val	Asp 525	Glu	Glu	Glu
His	Lys 530	Asp	Ile	Val	Val	Ser 535	Gly	Ile	Leu	Val	Ser 540	Asp	Asp	Lys	Asn
Phe 545	Glu	Leu	Asp	Phe	Leu 550	Ser	Leu	Ser	Asp	Leu 555	Arg	Glu	His	His	Pro 560
Asp	Leu	Ser	Thr	Thr 565	Ile	Leu	Arg	Glu	Arg 570	Gln	Ser	Val	Arg	Val 575	Asn
Cys	Lys	Lys	Glu 580	Leu	Ile	Tyr	Trp	His 585	Ile	Leu	Gln	Met	Phe 590	Gly	Glu
Ala	Glu	Val 595	Leu	Gln	Asp	Asp	Asp 600	Arg	Val	Thr	Asn	Gln 605	Glu	Pro	Lys
Val	Lys 610	Glu	Glu	Ser	Lys	Asp 615	Asn	Leu	Thr	Asn	Thr 620	Gly	Lys	Leu	Ile
Leu 625	Gln	Ile	Met	Gly	Asp 630	Ile	Lys	Leu	Thr	Ile 635	Val	Asn	Thr	Leu	Ala 640

Val Val Glu Trp Thr Gln Asp Leu Met Asn Asp Thr Val Ala Asp Ser
645 650 655

Ile Ile Ala Ile Leu Met Asn Val Asp Ser Ala Pro Ala Ser Val Lys
660 665 670

Leu Ser Ser His Ser Cys Asp Asp His Asp His Asn Asn Val Gln Ser
675 680 685

Asn Ala Gln Gly Lys Ile Asp Glu Val Glu Arg Val Lys Gln Ile Ser
690 695 700

Arg Leu Phe Lys Glu Gln Phe Gly Asp Cys Phe Thr Leu Phe Leu Asn
705 710 715 720

Lys Asp Glu Tyr Ala Ser Asn Lys Glu Glu Thr Ile Thr Gly Val Val
725 730 735

Thr Ile Gly Lys Ser Thr Ala Lys Ile Asp Phe Asn Asn Met Lys Ile
740 745 750

Leu Glu Cys Asn Ser Asn Pro Leu Lys Gly Arg Val Glu Ser Leu Leu
755 760 765

Asn Ile Gly Gly Asn Leu Val Thr Pro Leu Cys
770 775

<210> 236

<211> 554

<212> PRT

<213> Synechocystis sp.

<400> 236

Met Thr Phe Ser Val Pro Thr Gln Gly Lys Ala Phe Ala Asn Ile Ser
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Phe Leu Pro Tyr Gly Val Gly Pro Arg Asp Gly Gly Ile Cys Leu Glu
20 25 30

Leu His Leu Gly Pro Tyr Arg Ile Leu Leu Asp Cys Gly Leu Glu Asp
35 40 45

Leu Thr Pro Leu Leu Ala Ala Asp Pro Gly Thr Val Asp Leu Val Phe
50 55 60

Cys Ser His Ala His Arg Asp His Gly Leu Gly Leu Trp Gln Phe His
65 70 75 80

Gln Gln Phe Pro His Ile Pro Ile Leu Ala Ser Glu Val Thr Gln Arg
85 90 95

Leu Leu Pro Leu Asn Trp Pro Asp Glu Phe Val Pro Pro Phe Cys Arg
100 105 110

Val Leu Pro Trp Arg Ser Pro Gln Glu Val Leu Pro Gly Leu Thr Val
115 120 125

Glu Leu Leu Pro Ala Gly His Leu Pro Gly Ala Ala Leu Ile Leu Leu
130 135 140

Glu Tyr His Asn Gly Asp Arg Leu Tyr Arg Val Ile Tyr Thr Gly Asp
145 150 155 160

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Tyr Cys Leu Ser His Leu Gln Leu Val Asp Gly Leu Ala Leu Thr Pro
 165 170 175
 Leu Arg Gly Leu Lys Pro Asp Val Leu Ile Leu Glu Gly His Tyr Gly
 180 185 190
 Asn Arg Arg Leu Pro His Arg Arg Gln Gln Glu Lys Gln Phe Ile Gln
 195 200 205
 Ala Ile Glu Thr Val Leu Ala Lys Gly Arg Asn Ile Leu Leu Pro Val
 210 215 220
 Pro Pro Leu Gly Leu Ala Gln Glu Ile Leu Lys Leu Leu Arg Thr His
 225 230 235 240
 His Gln Phe Thr Gly Arg Gln Val Asn Leu Trp Ala Gly Glu Ser Val
 245 250 255
 Ala Arg Gly Cys Asp Ala Tyr Gln Gly Ile Ile Asp His Leu Pro Asp
 260 265 270
 Asn Val Arg Asn Phe Ala Gln His Gln Pro Leu Phe Trp Asp Asp Lys
 275 280 285
 Val Tyr Pro His Leu Arg Pro Leu Thr Asp Asp Gln Gly Glu Leu Ser
 290 295 300
 Leu Ser Ala Pro Ser Ile Val Ile Thr Thr Thr Trp Pro Ala Phe Trp
 305 310 315 320
 Pro Ser Pro Ala Ala Leu Pro Gly Leu Trp Thr Val Phe Met Pro Gln
 325 330 335
 Leu Leu Thr Leu Pro Ser Cys Leu Val Asn Phe Ala Trp Gln Asp Leu
 340 345 350
 Glu Glu Phe Pro Lys Tyr Glu Leu Glu Asp Tyr Leu Leu Ala Asp His
 355 360 365
 Ser Asp Gly Arg Asn Thr Thr Gln Leu Ile His Asn Leu Arg Pro Gln
 370 375 380
 His Leu Val Phe Val His Gly Gln Pro Ser Asp Ile Glu Asp Leu Thr
 385 390 395 400
 Ser Leu Glu Glu Leu Gln Ser Arg Tyr Gln Leu His Ser Pro Ala Ala
 405 410 415
 Gly Asn Ala Val Ala Leu Pro Ile Gly Asp Arg Phe Val Gln Pro Thr
 420 425 430
 Pro Pro Pro Pro Gln Ile Tyr Glu Gly Glu Ile His Glu Leu Glu Pro
 435 440 445
 Asn Lys Gln Ile His His Leu Gly Glu Val Val Ile His Leu Asp Gly
 450 455 460
 Gln Ile Leu Glu Asn Ser Arg Trp Gly Lys Phe Gly Glu Thr Gly Ile
 465 470 475 480
 Val Gln Ala Arg Trp Gln Gly Glu Glu Leu Val Leu Arg Gly Ile Ser
 485 490 495

Gln Arg Glu Leu Leu Lys Gln Asn Gln Ser Ser Lys Arg Pro Val Asp
500 505 510

Phe Asp Cys Cys Ala Asn Cys Arg His Phe Gln His Tyr His Cys Arg
515 520 525

Asn Pro Val Ser Pro Leu Met Gly Leu Glu Val Arg Ala Asp Gly His
530 535 540

Cys Pro Val Phe Glu Ser Val Ala Ser Ser
545 550

<210> 237

<211> 636

<212> PRT

<213> Methanobacterium thermoautotrophicum

<400> 237

Met Val Ser Glu Met Leu Glu Glu Ile Lys Arg Thr Ile Met Gln Arg
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Leu Pro Glu Arg Val Gln Val Ala Lys Val Glu Phe Glu Gly Pro Glu
20 25 30

Val Val Ile Tyr Thr Lys Asn Pro Glu Ile Ile Thr Glu Asn Gly Asn
35 40 45

Leu Ile Arg Asp Ile Ala Lys Asp Ile Arg Lys Arg Ile Ile Ile Arg
50 55 60

Ser Asp Arg Ser Val Leu Met Asp Pro Glu Lys Ala Ile Arg Lys Ile
65 70 75 80

His Glu Ile Val Pro Glu Glu Ala Lys Ile Thr Asn Ile Ser Phe Asp
85 90 95

Asp Val Thr Cys Glu Val Ile Ile Glu Ala Arg Lys Pro Gly Leu Val
100 105 110

Ile Gly Lys Tyr Gly Ser Thr Ser Arg Glu Ile Val Lys Asn Thr Gly
115 120 125

Trp Ala Pro Lys Ile Leu Arg Thr Pro Pro Ile Ser Ser Glu Ile Ile
130 135 140

Glu Arg Ile Arg Arg Thr Leu Arg Lys Asn Ser Lys Glu Arg Lys Lys
145 150 155 160

Ile Leu Gln Gln Leu Gly Asn Arg Ile His Gln Lys Pro Lys Tyr Asp
165 170 175

Asn Asp Trp Ala Arg Leu Thr Ala Met Gly Gly Phe Arg Glu Val Gly
180 185 190

Arg Ser Cys Leu Tyr Leu Gln Thr Pro Asn Ser Arg Val Leu Leu Asp
195 200 205

Cys Gly Val Asn Val Ala Gly Gly Asp Asp Lys Asn Ser Tyr Pro Tyr
210 215 220

Leu Asn Val Pro Glu Phe Thr Leu Asp Ser Leu Asp Ala Val Ile Ile
225 230 235 240

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Thr His Ala His Leu Asp His Ser Gly Phe Leu Pro Tyr Leu Tyr His
 245 250 255
 Tyr Gly Tyr Asp Gly Pro Val Tyr Cys Thr Ala Pro Thr Arg Asp Leu
 260 265 270
 Met Thr Leu Leu Gln Leu Asp His Ile Asp Ile Ala His Arg Glu Asp
 275 280 285
 Glu Pro Leu Pro Phe Asn Val Lys His Val Lys Lys Ser Val Lys His
 290 295 300
 Thr Ile Thr Leu Asp Tyr Gly Glu Val Thr Asp Ile Ala Pro Asp Ile
 305 310 315 320
 Arg Leu Thr Leu His Asn Ala Gly His Ile Leu Gly Ser Ala Met Ala
 325 330 335
 His Leu His Ile Gly Asp Gly Gln His Asn Met Val Tyr Thr Gly Asp
 340 345 350
 Phe Lys Tyr Glu Gln Ser Arg Leu Leu Glu Ala Ala Ala Asn Arg Phe
 355 360 365
 Pro Arg Ile Glu Thr Leu Val Met Glu Ser Thr Tyr Gly Gly His Glu
 370 375 380
 Asp Val Gln Pro Ser Arg Asn Arg Ala Glu Lys Glu Leu Val Lys Thr
 385 390 395 400
 Ile Tyr Ser Thr Leu Arg Arg Gly Gly Lys Ile Leu Ile Pro Val Phe
 405 410 415
 Ala Val Gly Arg Ala Gln Glu Leu Met Ile Val Leu Glu Glu Tyr Ile
 420 425 430
 Arg Thr Gly Ile Ile Asp Glu Val Pro Val Tyr Ile Asp Gly Met Ile
 435 440 445
 Trp Glu Ala Asn Ala Ile His Thr Ala Arg Pro Glu Tyr Leu Ser Lys
 450 455 460
 Asp Leu Arg Asp Gln Ile Phe His Met Gly His Asn Pro Phe Ile Ser
 465 470 475 480
 Asp Ile Phe His Lys Val Asn Gly Met Asp Glu Arg Arg Glu Ile Val
 485 490 495
 Glu Gly Glu Pro Ser Ile Ile Leu Ser Thr Ser Gly Met Leu Thr Gly
 500 505 510
 Gly Asn Ser Leu Glu Tyr Phe Lys Trp Leu Cys Glu Asp Pro Asp Asn
 515 520 525
 Ser Leu Val Phe Val Gly Tyr Gln Ala Glu Gly Ser Leu Gly Arg Arg
 530 535 540
 Ile Gln Lys Gly Trp Lys Glu Ile Pro Leu Lys Asp Glu Asp Asp Lys
 545 550 555 560
 Met Arg Val Tyr Asn Val Arg Met Asn Ile Lys Thr Ile Glu Gly Phe
 565 570 575

0998607 12004

Ser Gly His Ser Asp Arg Arg Gln Leu Met Glu Tyr Val Lys Arg Ile
580 585 590

Ser Pro Lys Pro Glu Lys Ile Leu Leu Cys His Gly Asp Asn Tyr Lys
595 600 605

Thr Leu Asp Leu Ala Ser Ser Ile Tyr Arg Thr Tyr Arg Ile Glu Thr
610 615 620

Lys Thr Pro Leu Asn Leu Glu Thr Val Arg Ile Gln
625 630 635

<210> 238

<211> 1040

<212> PRT

<213> Homo sapiens

<400> 238

Met Leu Glu Asp Ile Ser Glu Glu Asp Ile Trp Glu Tyr Lys Ser Lys
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Arg Lys Pro Lys Arg Val Asp Pro Asn Asn Gly Ser Lys Asn Ile Leu
20 25 30

Lys Ser Val Glu Lys Ala Thr Asp Gly Lys Tyr Gln Ser Lys Arg Ser
35 40 45

Arg Asn Arg Lys Arg Ala Ala Glu Ala Lys Glu Val Lys Asp His Glu
50 55 60

Val Pro Leu Gly Asn Ala Gly Cys Gln Thr Ser Val Ala Ser Ser Gln
65 70 75 80

Asn Ser Ser Cys Gly Asp Gly Ile Gln Gln Thr Gln Asp Lys Glu Thr
85 90 95

Thr Pro Gly Lys Leu Cys Arg Thr Gln Lys Ser Gln His Val Ser Pro
100 105 110

Lys Ile Arg Pro Val Tyr Asp Gly Tyr Cys Pro Asn Cys Gln Met Pro
115 120 125

Phe Ser Ser Leu Ile Gly Gln Thr Pro Arg Trp His Val Phe Glu Cys
130 135 140

Leu Asp Ser Pro Pro Arg Ser Glu Thr Glu Cys Pro Asp Gly Leu Leu
145 150 155 160

Cys Thr Ser Thr Ile Pro Phe His Tyr Lys Arg Tyr Thr His Phe Leu
165 170 175

Leu Ala Gln Ser Arg Ala Gly Asp His Pro Phe Ser Ser Pro Ser Pro
180 185 190

Ala Ser Gly Gly Ser Phe Ser Glu Thr Lys Ser Gly Val Leu Cys Ser
195 200 205

Leu Glu Glu Arg Trp Ser Ser Tyr Gln Asn Gln Thr Asp Asn Ser Val
210 215 220

Ser Asn Asp Pro Leu Leu Met Thr Gln Tyr Phe Lys Lys Ser Pro Ser
225 230 235 240

00908660
"112001"

Leu	Thr	Glu	Ala	Ser	Glu	Lys	Ile	Ser	Thr	His	Ile	Gln	Thr	Ser	Gln
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Gln	Ala	Leu	Gln	Phe	Thr	Asp	Phe	Val	Glu	Asn	Asp	Lys	Leu	Val	Gly
			260					265					270		
Val	Ala	Leu	Arg	Leu	Ala	Asn	Asn	Ser	Glu	His	Ile	Asn	Leu	Pro	Leu
			275				280					285			
Pro	Glu	Asn	Asp	Phe	Ser	Asp	Cys	Glu	Ile	Ser	Tyr	Ser	Pro	Leu	Gln
			290			295					300				
Ser	Asp	Glu	Asp	Thr	His	Asp	Ile	Asp	Glu	Lys	Pro	Asp	Asp	Ser	Gln
305					310					315					320
Glu	Gln	Leu	Phe	Phe	Thr	Glu	Ser	Ser	Lys	Asp	Gly	Ser	Leu	Glu	Glu
				325					330					335	
Asp	Asp	Asp	Ser	Cys	Gly	Phe	Phe	Lys	Lys	Arg	His	Gly	Pro	Leu	Leu
			340					345					350		
Lys	Asp	Gln	Asp	Glu	Ser	Cys	Pro	Lys	Val	Asn	Ser	Phe	Leu	Thr	Arg
		355					360					365			
Asp	Lys	Tyr	Asp	Glu	Gly	Leu	Tyr	Arg	Phe	Asn	Ser	Leu	Asn	Asp	Leu
		370				375					380				
Ser	Gln	Pro	Ile	Ser	Gln	Asn	Asn	Glu	Ser	Thr	Leu	Pro	Tyr	Asp	Leu
385					390					395					400
Ala	Cys	Thr	Gly	Gly	Asp	Phe	Val	Leu	Phe	Pro	Pro	Ala	Leu	Ala	Gly
				405					410					415	
Lys	Leu	Ala	Ala	Ser	Val	His	Gln	Ala	Thr	Lys	Ala	Lys	Pro	Asp	Glu
			420					425					430		
Pro	Glu	Phe	His	Ser	Ala	Gln	Ser	Asn	Lys	Gln	Lys	Gln	Val	Ile	Glu
		435					440					445			
Glu	Ser	Ser	Val	Tyr	Asn	Gln	Val	Ser	Leu	Pro	Leu	Val	Lys	Ser	Leu
		450				455					460				
Met	Leu	Lys	Pro	Phe	Glu	Ser	Gln	Val	Glu	Gly	Tyr	Leu	Ser	Ser	Gln
465					470					475					480
Pro	Thr	Gln	Asn	Thr	Ile	Arg	Lys	Leu	Ser	Ser	Glu	Asn	Leu	Asn	Ala
				485					490					495	
Lys	Asn	Asn	Thr	Asn	Ser	Ala	Cys	Phe	Cys	Arg	Lys	Ala	Leu	Glu	Gly
			500					505					510		
Val	Pro	Val	Gly	Lys	Ala	Thr	Ile	Leu	Asn	Thr	Glu	Asn	Leu	Ser	Ser
		515					520					525			
Thr	Pro	Ala	Pro	Lys	Tyr	Leu	Lys	Ile	Leu	Pro	Ser	Gly	Leu	Lys	Tyr
		530				535					540				
Asn	Ala	Arg	His	Pro	Ser	Thr	Lys	Val	Met	Lys	Gln	Met	Asp	Ile	Gly
545					550					555					560
Val	Tyr	Phe	Gly	Leu	Pro	Pro	Lys	Arg	Lys	Glu	Glu	Lys	Leu	Leu	Gly
				565					570					575	

Glu Ser Ala Leu Glu Gly Ile Asn Leu Asn Pro Val Pro Ser Pro Asn
 580 585 590
 Gln Lys Arg Ser Ser Gln Cys Lys Arg Lys Ala Glu Lys Ser Leu Ser
 595 600 605
 Asp Leu Glu Phe Asp Ala Ser Thr Leu His Glu Ser Gln Leu Ser Val
 610 615 620
 Glu Leu Ser Ser Glu Arg Ser Gln Arg Gln Lys Lys Arg Cys Arg Lys
 625 630 635 640
 Ser Asn Ser Leu Gln Glu Gly Ala Cys Gln Lys Arg Ser Asp His Leu
 645 650 655
 Ile Asn Thr Glu Ser Glu Ala Val Asn Leu Ser Lys Val Lys Val Phe
 660 665 670
 Thr Lys Ser Ala His Gly Gly Leu Gln Arg Gly Asn Lys Lys Ile Pro
 675 680 685
 Glu Ser Ser Asn Val Gly Gly Ser Arg Lys Lys Thr Cys Pro Phe Tyr
 690 695 700
 Lys Lys Ile Pro Gly Thr Gly Phe Thr Val Asp Ala Phe Gln Tyr Gly
 705 710 715 720
 Val Val Glu Gly Cys Thr Ala Tyr Phe Leu Thr His Phe His Ser Asp
 725 730 735
 His Tyr Ala Gly Leu Ser Lys His Phe Thr Phe Pro Val Tyr Cys Ser
 740 745 750
 Glu Ile Thr Gly Asn Leu Leu Lys Asn Lys Leu His Val Gln Glu Gln
 755 760 765
 Tyr Ile His Pro Leu Pro Leu Asp Thr Glu Cys Ile Val Asn Gly Val
 770 775 780
 Lys Val Val Leu Leu Asp Ala Asn His Cys Pro Gly Ala Val Met Ile
 785 790 795 800
 Leu Phe Tyr Leu Pro Asn Gly Thr Val Ile Leu His Thr Gly Asp Phe
 805 810 815
 Arg Ala Asp Pro Ser Met Glu Arg Ser Leu Leu Ala Asp Gln Lys Val
 820 825 830
 His Met Leu Tyr Leu Asp Thr Thr Tyr Cys Ser Pro Glu Tyr Thr Phe
 835 840 845
 Pro Ser Gln Gln Glu Val Ile Arg Phe Ala Ile Asn Thr Ala Phe Glu
 850 855 860
 Ala Val Thr Leu Asn Pro His Ala Leu Val Val Cys Gly Thr Tyr Ser
 865 870 875 880
 Ile Gly Lys Glu Lys Val Phe Leu Ala Ile Ala Asp Val Leu Gly Ser
 885 890 895
 Lys Val Gly Met Ser Gln Glu Lys Tyr Lys Thr Leu Gln Cys Leu Asn
 900 905 910

09988667 112004

Ile Pro Glu Ile Asn Ser Leu Ile Thr Thr Asp Met Cys Ser Ser Leu
915 920 925

Val His Leu Leu Pro Met Met Gln Ile Asn Phe Lys Gly Leu Gln Ser
930 935 940

His Leu Lys Lys Cys Gly Gly Lys Tyr Asn Gln Ile Leu Ala Phe Arg
945 950 955 960

Pro Thr Gly Trp Thr His Ser Asn Lys Phe Thr Arg Ile Ala Asp Val
965 970 975

Ile Pro Gln Thr Lys Gly Asn Ile Ser Ile Tyr Gly Ile Pro Tyr Ser
980 985 990

Glu His Ser Ser Tyr Leu Glu Met Lys Arg Phe Val Gln Trp Leu Lys
995 1000 1005

Pro Gln Lys Ile Ile Pro Thr Val Asn Val Gly Thr Trp Lys Ser Arg
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Ser Thr Met Glu Lys Tyr Phe Arg Glu Trp Lys Leu Glu Ala Gly Tyr
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<212> PRT

<213> Arabidopsis thaliana

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Ser Ser Gln Leu Ser Ile Arg Lys Pro Leu His Pro Thr Asn Ala Asn
20 25 30

Asn Ile Ser His Arg Pro Pro Asn Lys Lys Pro Arg Leu Cys Arg Tyr
35 40 45

Pro Gly Lys Glu Asn Val Thr Pro Pro Pro Ser Pro Asp Pro Asp Leu
50 55 60

Phe Cys Ser Ser Ser Thr Pro His Cys Ile Leu Asp Cys Ile Pro Ser
65 70 75 80

Ser Val Asp Cys Ser Leu Gly Asp Phe Asn Gly Pro Ile Ser Ser Leu
85 90 95

Gly Glu Glu Asp Lys Glu Asp Lys Asp Asp Cys Ile Lys Val Asn Arg
100 105 110

Glu Gly Tyr Leu Cys Asn Ser Met Glu Ala Arg Leu Leu Lys Ser Arg
115 120 125

Ile Cys Leu Gly Phe Asp Ser Gly Ile His Glu Asp Asp Glu Gly Phe
130 135 140

Val Glu Ser Asn Ser Glu Leu Asp Val Leu Ile Asn Leu Cys Ser Glu
145 150 155 160

09933697-112004

Ser	Glu	Gly	Arg	Ser	Gly	Glu	Phe	Ser	Leu	Gly	Lys	Asp	Asp	Ser	Ile
				165					170						175
Gln	Cys	Pro	Leu	Cys	Ser	Met	Asp	Ile	Ser	Ser	Leu	Ser	Glu	Glu	Gln
			180					185					190		
Arg	Gln	Val	His	Ser	Asn	Thr	Cys	Leu	Asp	Lys	Ser	Tyr	Asn	Gln	Pro
		195					200					205			
Ser	Glu	Gln	Asp	Ser	Leu	Arg	Lys	Cys	Glu	Asn	Leu	Ser	Ser	Leu	Ile
	210					215					220				
Lys	Glu	Ser	Ile	Asp	Asp	Pro	Val	Gln	Leu	Pro	Gln	Leu	Val	Thr	Asp
225					230					235					240
Leu	Ser	Pro	Val	Leu	Lys	Trp	Leu	Arg	Ser	Leu	Gly	Leu	Ala	Lys	Tyr
				245					250					255	
Glu	Asp	Val	Phe	Ile	Arg	Glu	Glu	Ile	Asp	Trp	Asp	Thr	Leu	Gln	Ser
			260					265					270		
Leu	Thr	Glu	Glu	Asp	Leu	Leu	Ser	Ile	Gly	Ile	Thr	Ser	Leu	Gly	Pro
		275					280					285			
Arg	Lys	Lys	Ile	Val	Asn	Ala	Leu	Ser	Gly	Val	Arg	Asp	Pro	Phe	Ala
	290					295					300				
Ser	Ser	Ala	Glu	Val	Gln	Ala	Gln	Ser	His	Cys	Thr	Ser	Gly	His	Val
305					310					315					320
Thr	Glu	Arg	Gln	Arg	Asp	Lys	Ser	Thr	Thr	Arg	Lys	Ala	Ser	Glu	Pro
				325					330					335	
Lys	Lys	Pro	Thr	Ala	Asn	Lys	Leu	Ile	Thr	Glu	Phe	Phe	Pro	Gly	Gln
			340					345					350		
Ala	Thr	Glu	Gly	Thr	Lys	Ile	Arg	Thr	Ala	Pro	Lys	Pro	Val	Ala	Glu
		355					360					365			
Lys	Ser	Pro	Ser	Asp	Ser	Ser	Ser	Arg	Arg	Ala	Val	Arg	Arg	Asn	Gly
	370					375					380				
Asn	Asn	Gly	Lys	Ser	Lys	Val	Ile	Pro	His	Trp	Asn	Cys	Ile	Pro	Gly
385					390					395					400
Thr	Pro	Phe	Arg	Val	Asp	Ala	Phe	Lys	Tyr	Leu	Thr	Arg	Asp	Cys	Cys
				405					410					415	
His	Trp	Phe	Leu	Thr	His	Phe	His	Leu	Asp	His	Tyr	Gln	Gly	Leu	Thr
			420					425					430		
Lys	Ser	Phe	Ser	His	Gly	Lys	Ile	Tyr	Cys	Ser	Leu	Val	Thr	Ala	Lys
		435					440					445			
Leu	Val	Asn	Met	Lys	Ile	Gly	Ile	Pro	Trp	Glu	Arg	Leu	Gln	Val	Leu
	450					455					460				
Asp	Leu	Gly	Gln	Lys	Val	Asn	Ile	Ser	Gly	Ile	Asp	Val	Thr	Cys	Phe
465					470					475					480
Asp	Ala	Asn	His	Cys	Pro	Gly	Ser	Ile	Met	Ile	Leu	Phe	Glu	Pro	Ala
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<211> 661
<212> PRT
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          20          25          30
Lys Asn Thr His Thr Ser Ser Lys Arg Gln Arg Thr Leu Thr Glu Phe
          35          40          45
Asn Ile Pro Thr Ser Ser Asn Leu Pro Val Arg Ser Ser Ser Tyr Ser
  50          55          60

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Phe 65	Ser	Arg	Phe	Ser	Cys 70	Ser	Thr	Ser	Asn	Lys 75	Asn	Thr	Glu	Pro	Val 80
Ile	Ile	Asn	Asp	Asp 85	Asp	His	Asn	Ser	Ile 90	Cys	Leu	Glu	Asp	Thr 95	Ala
Lys	Val	Glu	Ile 100	Thr	Ile	Asp	Thr	Asp 105	Glu	Glu	Glu	Leu	Val 110	Ser	Leu
His	Asp	Asn 115	Glu	Val	Ser	Ala	Ile 120	Glu	Asn	Arg	Thr	Glu 125	Asp	Arg	Ile
Val	Thr 130	Glu	Leu	Glu	Glu	Gln 135	Val	Asn	Val	Lys	Val 140	Ser	Thr	Glu	Val
Ile 145	Gln	Cys	Pro	Ile	Cys 150	Leu	Glu	Asn	Leu	Ser 155	His	Leu	Glu	Leu	Tyr 160
Glu	Arg	Glu	Thr	His 165	Cys	Asp	Thr	Cys	Ile 170	Gly	Ser	Asp	Pro	Ser 175	Asn
Met	Gly	Thr	Pro 180	Lys	Lys	Asn	Ile	Arg 185	Ser	Phe	Ile	Ser	Asn 190	Pro	Ser
Ser	Pro	Ala 195	Lys	Thr	Lys	Arg	Asp 200	Ile	Ala	Thr	Ser	Lys 205	Lys	Pro	Thr
Arg	Val 210	Lys	Leu	Val	Leu	Pro 215	Ser	Phe	Lys	Ile	Ile 220	Lys	Phe	Asn	Asn
Gly 225	His	Glu	Ile	Val	Val 230	Asp	Gly	Phe	Asn	Tyr 235	Lys	Ala	Ser	Glu	Thr 240
Ile	Ser	Gln	Tyr	Phe 245	Leu	Ser	His	Phe	His 250	Ser	Asp	His	Tyr	Ile 255	Gly
Leu	Lys	Lys	Ser 260	Trp	Asn	Asn	Pro	Asp 265	Glu	Asn	Pro	Ile	Lys 270	Lys	Thr
Leu	Tyr	Cys 275	Ser	Lys	Ile	Thr	Ala 280	Ile	Leu	Val	Asn	Leu 285	Lys	Phe	Lys
Ile	Pro 290	Met	Asp	Glu	Ile	Gln 295	Ile	Leu	Pro	Met	Asn 300	Lys	Arg	Phe	Trp
Ile 305	Thr	Asp	Thr	Ile	Ser 310	Val	Val	Thr	Leu	Asp 315	Ala	Asn	His	Cys	Pro 320
Gly	Ala	Ile	Ile	Met 325	Leu	Phe	Gln	Glu	Phe 330	Leu	Ala	Asn	Ser	Tyr 335	Asp
Lys	Pro	Ile	Arg 340	Gln	Ile	Leu	His	Thr 345	Gly	Asp	Phe	Arg	Ser 350	Asn	Ala
Lys	Met	Ile 355	Glu	Thr	Ile	Gln	Lys 360	Trp	Leu	Ala	Glu	Thr 365	Ala	Asn	Glu
Thr	Ile 370	Asp	Gln	Val	Tyr	Leu 375	Asp	Thr	Thr	Tyr	Met 380	Thr	Met	Gly	Tyr
Asn 385	Phe	Pro	Ser	Gln	His 390	Ser	Val	Cys	Glu	Thr 395	Val	Ala	Asp	Phe	Thr 400

[illegible]